



**SLOVENSKI STANDARD**  
**kSIST prEN 1447:2008**

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Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes -  
Determination of long-term resistance to internal pressure

Kunststoff-Rohrleitungssysteme - Rohre aus glasfaserverstärkten duroplastischen  
Kunststoffen (GFK) - Bestimmung der Langzeit-Widerstandsfähigkeit gegen Innendruck

Systèmes de canalisations en plastiques - Tubes en plastiques thermodurcissables  
renforcés de verre (PRV) - Détermination de la résistance à long terme à la pression  
interne

**Ta slovenski standard je istoveten z: prEN 1447**

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**ICS:**

23.040.20 Cevi iz polimernih materialov Plastics pipes

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**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**FINAL DRAFT**  
**prEN 1447**

October 2008

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ICS 23.040.20

Will supersede EN 1447:1996

English Version

## Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of long-term resistance to internal pressure

Systèmes de canalisations en plastiques - Tubes en  
plastiques thermodurcissables renforcés de verre (PRV) -  
Détermination de la résistance à long terme à la pression  
interne

Kunststoff-Rohrleitungssysteme - Rohre aus  
glasfaserverstärkten duroplastischen Kunststoffen (GFK) -  
Bestimmung der Langzeit-Widerstandsfähigkeit gegen  
Innendruck

This draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 155.

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## Foreword

This document (prEN 1447:2008) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 1447:1996.

The main modifications are:

— Correction of the valid failure zone limits and the use and reporting of data outside the valid zone.

The material-dependent parameters and/or performance requirements are incorporated in the referring standard.

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

## Introduction

This standard describes a method for determining the long-term resistance to internal pressure of glass-reinforced thermosetting plastics (GRP) pipes.

It is a method which uses the following conditions:

- water as the reference liquid inside the test piece;
- water or air as the environment outside the test piece.

The method can be used for tests at different temperatures. It should be noted that, for a given temperature, the results obtained can differ depending on the end loading conditions and whether the external environment is water or air.

The method described in this standard differs from those in some other similar standards, in the following details:

- the failure criteria and the detection of failure;
- the strain in the longitudinal and circumferential directions may be measured during the test;
- the test pressure is maintained constant.

This method may be used to obtain data to establish internal pressure versus time-to-failure relationships at different temperatures. The procedures for establishing the relationships are not within the scope of this standard. For such purposes attention is drawn to EN 705.

## 1 Scope

This standard specifies a method for determining the time to failure of glass-reinforced thermosetting plastics (GRP) pipes under internal hydrostatic pressure at a specified temperature. The external environment can be air or water.

NOTE For other internal or external environments the referring standard should specify any additional requirement.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 705, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Methods for regression analyses and their use*

## 3 Definitions

For the purposes of this standard, the following definitions apply:

### 3.1

#### **failure**

any continuous loss of pressure resulting from the passage of the test liquid through the wall of the test piece under test (see 9.1)

### 3.2

#### **bursting**

failure by rupture of the pipe wall with immediate loss of test liquid and drop of pressure (see 9.1 and 9.2.2)

### 3.3

#### **leaking**

failure by loss of the pressurizing liquid through the pipe wall to an extent detectable visually and/or by a continuous drop in pressure (see 9.1, 9.2.1 and 9.2.2)

### 3.4

#### **weeping**

failure by passage of the pressurizing liquid through the pipe wall to an extent detectable visually or electronically (see 9.1 and 9.2.3)

## 4 Principle

A cut length of pipe at the required temperature is subjected to a specified internal hydrostatic pressure to cause a state of stress in the pipe wall which depends upon the loading conditions, i.e. with or without the effects of end thrust being carried by the pipe wall. The results of tests at different end loading conditions will be different even for the same pipe. Water or air may be used as the environment outside of the test piece.

The test samples are held at the test pressure until failure occurs. Typically the time to failure is longer at lower pressures (stresses).

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In general, a series of tests are conducted over various failure times and the results obtained analysed in accordance with EN 705 to establish a long term value. The number of tests required, the appropriate time intervals and the time at which a value is established are given in the referring standard.

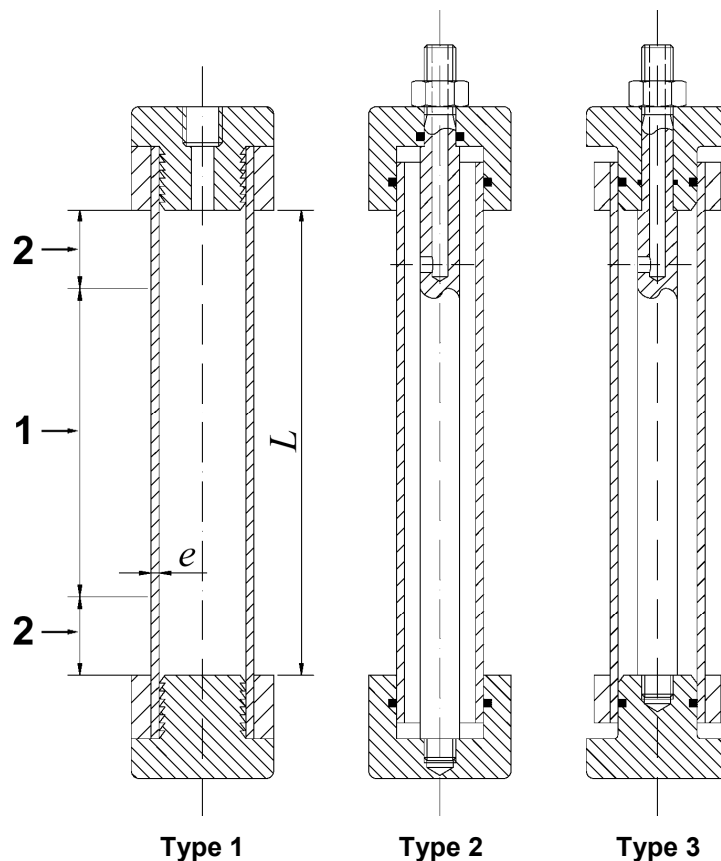
NOTE It is assumed that the following test parameters are set by the standard making reference to this standard:

- whether or not the test piece is to be loaded by the hydrostatic end thrust while under pressure (see 5.2);
- free length,  $L$ , of the test piece (see 6.1);
- number of test pieces (see 6.3);
- test temperature and its tolerance (see 8.1);
- if and what strain measurements are required (see 8.2);
- external environmental fluid, i.e. water or air (see 8.3) or other environment (see note to Clause 1);
- internal environmental fluid, if not water or a test liquid for the purposes of 5.7 and 9.2.3 (see note to Clause 1).

## 5 Apparatus

**5.1 Dimensional measurement devices**, capable of determining the dimensions (length, diameters, wall thickness) to an accuracy of within  $\pm 1,0\%$ .

**5.2 End sealing devices for the test piece**, capable of inducing the specified state of stress, i.e. with or without hydrostatic end thrust. (see Figure 1).



### Key

- Type 1 testing with end thrust
- Type 2 testing without end thrust, external seals
- Type 3 testing without end thrust, internal seals
- 1 valid failure zone
- 2 end fixture influence zone, equal to  $3,3([DN] \times e)^{0,5}$

Figure 1 — Typical arrangements for pressure testing of pipes